

1. A method of treating at least one flat panel display current emitter, said method comprising:

5 a) exposing at least a portion of said at least one current emitter to a hydrogenation process; and

b) exposing at least a portion of said at least one current emitter to a nitrogen infusion process.

10 2. A method as in claim 1, wherein said hydrogenation process is a plasma enhanced chemical vapor deposition process conducted in a reaction chamber.

15 3. A method as in claim 2, wherein said nitrogen infusion process is conducted in said reaction chamber following said plasma enhanced chemical vapor deposition process.

4. A method as in claim 2, wherein said plasma enhanced chemical vapor deposition process is conducted in the presence of silane gas.

20 5. A method as in claim 3, wherein said nitrogen infusion process is conducted in the presence of ammonia gas.

6. A method as in claim 4, wherein said plasma enhanced chemical vapor deposition process is conducted with a silane gas flow rate of about 1000 sccm, and RF power of about 200-300 watts, a chamber pressure of about 1200 mtorr and for a period of about 5 to 10 minutes.

7. A method as in claim 5, wherein said nitrogen infusion process is conducted with an ammonia gas flow rate of about 500 sccm, an RF power of about 300-400 watts, a chamber pressure of about 1200

mtorr and for a period of about 10 to 15 minutes.

8. A method as in claim 1, wherein said current emitter includes a base portion surrounded by an insulator and said current emitting portion extends from said insulator.

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9. A method as in claim 1, further comprising:

performing steps (a) and (b) on a plurality of current emitters.

10. A method as in claim 9, further comprising:

sealing said plurality of current emitters in a field emission display device.

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11. A method of fabricating a field emission device, said method comprising:

treating the tips of the current emitters of said field emission device with plasma enhanced chemical vapor deposition hydrogenation in a chamber; and

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treating said tips with nitrogen plasma while said tips are still in said chamber.

12. A field emission display device comprising:

at least one current emitter formed of a doped silicon;

20 a substrate having a phosphor coating therein, in or at least one region positioned to receive electrons emitted by said current emitter; and

said current emitter having a current emission surface which has been treated with a plasma enhanced chemical vapor deposition

hydrogenation process followed by a nitrogen infusion process, which reduces the concentration of oxygen at said current emission surface.

13. The device according to claim 12, wherein said current emitter resides on a base substrate covered by a barrier film.

5 14. The device according to claim 13, wherein said barrier film comprises silicon dioxide.

15. The device according to claim 13, wherein said current emitter has a base on said barrier layer and a projecting top connected with said base;

10 16. The device according to claim 13, wherein a conductive layer is deposited over said barrier film.

17. The device according to claim 16, wherein said conductive layer comprises aluminum.

15 18. The device according to claim 12, wherein said current emitter is surrounded on the sides by a insulating layer such that current may not radiate out of said sides of said current emitter, where said sides do not include the tip of said current emitter.

19. The device according to claim 18, wherein said insulating layer comprises silicon dioxide.

20 20. The device according to claim 18, wherein a silicon grid resides on top of said insulating layer.

21. The device according to claim 20, wherein a metal layer resides on top of said grid.

22. The device according to claim 21, wherein a passivation layer resides on top of said metal layer.

23. The device according to claim 22, wherein said passivation layer comprises nitride.